

Amendments to the Drawing Figures:

In Fig. 2b, the electromagnet has been numbered 11.

In Fig. 3, the lower beam switcher has been renumbered from 6b to 8b.

One replacement drawing sheet identified as sheet 2/2 is attached
including Figs 2b and 3.

REMARKS

After entry of this Amendment, claims 1-14 are pending in the application. Claims 5 and 9 are amended, and claims 10-14 are added in this amendment. Reconsideration of the application as amended is requested.

In the non-final office action dated June 6, 2006, the Examiner rejects claims 1 and 4-9 under 35 USC §102(b), and claims 2 and 3 under 35 USC §103(a). Additionally, the Examiner objects to the language "or similar" in line 3 and lines 3-5 of the abstract, citing MPEP §608.01(b). A revised abstract is included in the substitute specification deleting the claim language to which the Examiner objects. Reconsideration and withdrawal of the objection to the abstract is requested.

The Examiner objects to the specification under 37 CFR §1.52(a) and (b) as failing to include proper idiomatic English. The Examiner requests a substitute specification accompanied by a statement that it contains no new matter. A redline/strikeout version and a clean version of a substitute specification is submitted with this amendment complying with 37 CFR §1.52(a) and (b) and including proper idiomatic English. It is submitted that the substitute specification contains no new matter. Reconsideration and withdrawal of the objection to the specification is requested.

The Examiner objects to claim 5 because line 3 contains the phrase "and prism." Claim 5 has been corrected to read, "and a prism." Reconsideration and withdrawal of the objection to claim 5 is requested.

The Examiner rejects claims 1, 5 and 9 under 35 USC §112, 2nd ¶. With respect to claim 1, the Examiner objects to the phrase "this device" in line 4 due to an insufficient antecedent basis. To clarify that the antecedent basis was intended to have been provided by the introduction of "at least one device for detecting the passage of a coin" earlier in claim 1, "this device" has been replaced with "the at least one device." The Examiner objects to claim 5, stating the claim is indefinite for failing to particularly point out and distinctly claim the subject matter which applicants regard as the invention. Particularly, the Examiner states it is unclear what is being referred to by "the beam deflector is one of a mirror and prism

which deflects singly or multiply” in lines 2 and 3. This claim has been amended to refer instead to “the beam deflector is at least one of a mirror and a prism, which deflects a beam emitted by the at least one emitter at least once.” With respect to claim 9, the Examiner rejects the limitation “coin shaft” in line 3 due to a lack of antecedent basis and to the characterization that the coin shaft is blocked by a coin. The reference to the coin shaft in claim 9 has been deleted, and the claim has been amended to clarify that the quantity of radiation received by the beam receiver remains substantially the same when the beam emitted by the emitter, not the coin shaft, is blocked by a coin. Reconsideration and withdrawal of the Examiner’s 35 USC §112, 2nd ¶ rejections is requested.

The Examiner rejects claims 1 and 4-9 under 35 USC §102(b) as being anticipated by Newton et al. (US 5,485,906). The Examiner states that the Newton reference discloses a coin distributor having all the features of the present invention, including a moveable deflection member for sorting coins into either a rejection shaft or acceptance path and a beam deflector secured to the moveable deflection member. Claim 1 of the present invention requires the beam deflector to be secured to the moveable deflection member. Newton does not disclose this configuration. Newton discloses a prism 38 secured to a flap 36. The flap 36 is not identical with the accept gate 12. (Unlike the flap 36, the accept gate 12 in Newton is a moveable deflection member.) Instead, the flap 36 is attached to horizontal shafts 42 bridging pairs of downwardly depending arms 44 of accept gate 12. (See Newton, column 2, lines 59-63.) This arrangement permits the flap 36 and the accept gate 12 to perform completely different and independent movements. For example, the accept gate 12 can open and close independently of the flap 36. Even the abstract in Newton recognizes that the flap to which the prism 38 is secured is not identical to the accept gate when it states, “a sensing arrangement disposed *after* an accept gate.” [Italics added.] Therefore, the flap 36 and accept gate 12 are different elements, and the flap 36 is not a moveable deflection member. Additional differences between the flap and a deflection member also exist. The function of a deflection member is to permit acceptable coins to travel down a coin shaft and prohibit unacceptable coin from

traveling down the coin shaft. (See paragraph [0002] of the present specification, as well as column 1, line 67 to column 2, line 4 of Newton.) The flap 36 to which the prism 38 is attached in Newton is not a deflection member because it does not prohibit unacceptable coins from traveling down the coin shaft 18; indeed, the coin is already in the coin shaft 18, and thus past the accept gate 12, by the time the coin encounters the flap 36. Instead of deflecting a coin, the flap 36 merely prevents a coin from traveling back up the shaft it came down. The flap in Newton is designed to easily be pivoted away from its normal position, thereby permitting every coin to pass. (See Newton, column 3, lines 4-6.) Thus, the flap 36 in Newton does not function as a deflection member, and Newton does not disclose the beam deflector secured to the deflection member as required by claims 1 and 4-9. Moreover, regarding Examiner's rejection of claim 8 under 35 USC §102(b), the Examiner states that Newton discloses the quantity of radiation received by the beam receiver remains substantially the same when the beam is not blocked by a coin. However, Newton does not disclose this feature. In Newton, even after the coin falls below sensing arrangement 22, the flap 36 is still in a downward state. Even a small amount of flap 36 rotation away from the horizon causes the beam not to be deflected to the sensor 34. (See Newton, column 3, lines 15-17.) As a result, there is a time lag between when the coin passes through the beam and when the flap 36 and prism 38 have returned to a substantially horizontal position allowing the prism 38 to deflect the beam back to the sensor 34. In other words, even when the beam is not blocked by the coin, the quantity of radiation received by the beam receiver does not always remain substantially the same. Reconsideration and withdrawal of the Examiner's rejection under 35 USC §102(b) is requested.

The Examiner rejects claims 2 and 3 under 35 USC §103(a) as being unpatentable over Newton in view of Hoffman et al. (US 5,823,315). The Examiner states that Newton discloses all the features of the claims except a second detection device and Hoffman et al. discloses a second detection device. The Examiner states that it would have been obvious to one skilled in the art to have incorporated the second detection device disclosed by Hoffman et al. to prevent possible detection

errors. However, while Hoffman et al. discloses a first and a second detection device, neither the first nor the second detection device is secured to a moveable deflection member. Therefore, even when viewing Newton in light of Hoffman, a beam deflector secured to a moveable deflection member is not taught. Reconsideration and withdrawal of the Examiner's 35 USC §103(a) rejection is requested.

Finally, Applicants have added new claims 10-14. Applicants respectfully submit that claims 10 is allowable because none of the cited references teach a beam deflector secured to a moveable deflection member wherein a surface of the beam deflector is always substantially perpendicular to a beam emitted by at least one beam emitter, and claim 11 is allowable because none of the cited references teach a beam deflector secured to a moveable deflection member wherein an electromagnet drives the moveable deflection member. Claim 12 is allowable because none of the cited references teach a beam deflector secured in fixed relation to the moveable deflection member. Claim 13 is allowable because none of the cited references teach a beam deflector secured in fixed relation to a moveable deflection member wherein a surface of the beam deflector is always substantially perpendicular to a beam emitted by at least one beam emitter. Claim 14 is allowable because none of the cited references teach a beam deflector secured in fixed relation to a moveable deflection member wherein an electromagnet drives the moveable deflection member.

It is respectfully submitted that this Amendment traverses and overcomes all of the Examiner's objections and rejections to the application as originally filed. It is further submitted that this Amendment has antecedent basis in the application as originally filed, including the specification, claims and drawings, and that this Amendment does not add any new subject matter to the application. Reconsideration of the application as amended is requested. It is respectfully submitted that this Amendment places the application in suitable condition for allowance; notice of which is requested.

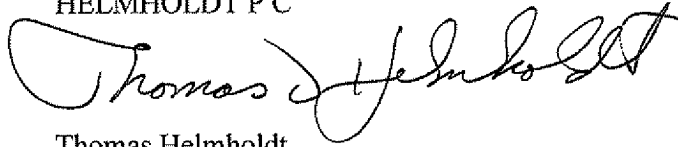
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If the Examiner feels that prosecution of the present application can be expedited by way of an Examiner's amendment, the Examiner is invited to contact the Applicant's attorney at the telephone number listed below.

Respectfully submitted,

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A handwritten signature in black ink, appearing to read "Thomas Helmholdt", written in a cursive style.

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PATENT

COIN DISTRIBUTOR

BACKGROUND FIELD OF THE INVENTION

[0001] The present application relates to a coin distributor for coin-operated equipment such as coin checkers ~~for example, in accordance with the preamble of claim 1.~~

BACKGROUND

[0002] Usually, in an electronic coin checker, the examined coin is guided by a coin distributor either into one or more acceptance shafts or even into a return shaft, ~~in dependence depending~~ on whether certain acceptance criteria are met. This occurs via deflection units, such as flaps for example, which are driven by electromagnets. Generally, a device for detecting the passage of a coin through a coin shaft ~~there is~~ arranged in the acceptance shaft below the deflection unit. ~~The~~ a device for detecting the passage of a coin through a coin shaft, e.g. a light barrier, ~~which~~ checks the presence of the accepted coin and sends a corresponding signal to a connected evaluation unit if a coin has passed into the light barrier or respectively out again. When the coin enters the light barrier, the evaluation unit interrupts the triggering of the electromagnet, such that the deflection unit (e.g. flap) assumes its rest position again and, when the coin exits from the light barrier, generates the credit signal.

[0003] In coin-operated machines which have a coin distributor ~~according to the preamble~~, attempts are repeatedly made to achieve credit signals fraudulently by the coins being suspended on threads and these coins then being withdrawn again after they have been dipped into the light barrier. If the coin, when it is dipped into the light barrier, is still located in the region of the flap, such a manipulation is easily possible since the flap is prevented by the coin from reaching its rest position by the coin. ~~Therefore, The the~~ way back is ~~therefore~~ kept open by the coin itself hanging on the thread.

[0004] One solution to this problem consists in arranging the light barrier so far below the flap that the latter can reach its rest position again when the coin dips into the light barrier (because the light barrier lies more than the diameter of a coin below the flap). Withdrawing the coin is then reliably prevented by the closed flap.

[0005] However, often the space available below the flap is not sufficient to thus achieve the necessary spacing between the deflection unit (flap) and the device for detecting the passage of a coin (in the light barrier of the prior art). For this purpose there is a known way of providing a light barrier arrangement with which the direction in which the coin dips into the light barrier and leaves it again can also be determined. This is possible for example by means of two light barriers arranged one behind the other. In this way, however, the problem of a lack of installation space is possibly made even greater such that the expert is in practice often obliged, in order to ~~optimise~~optimize installation space, to make concessions to safety requirements.

[0006] The document US 5 485 906 shows a coin distributor of this type. It contains on the one hand a displaceable deflection member for sorting coins into different coin shafts. Moreover a device is shown for detecting the passage of a coin through a coin shaft, this device including at least one emitter, a beam ~~switcher~~deflector and a beam receiver. This beam ~~switcher~~deflector is secured to a different flap from the deflection member, it being intended primarily that manipulation by withdrawing an inserted coin using a thread should be prevented with the aid of this flap. This document according to the prior art thus shows a device which is mechanically relatively extravagant and large-scale.

SUMMARY

[0007] ~~The object underlying the present invention, therefore, is to-~~
~~create~~provides a coin distributor to be fitted into coin checkers, which coin distributor can offer the highest possible amount of security with the smallest requirements in installation space.

[0008] ~~The~~This object is accomplished by a coin distributor according to the present invention provides the highest possible amount of security with the smallest installation space requirement.

[0009] Because in a coin distributor according to the present invention~~preamble~~, the beam ~~switcher~~deflector ~~of the device for detecting the~~ passage of a coin through a coin shaft is secured to the displaceable deflection member of the deflection unit for sorting coins into different coin shafts or the like, the installation space is ~~minimised~~minimized.

[0010] This opens up completely new constructional possibilities. Since the beam ~~switcher~~deflector is generally a passive element, a power supply or the like, which would be expensive to construct, is not necessary. On the other hand this also makes it possible to accommodate a device for detecting the passage of a coin, e.g. a light barrier, directly at the level of the displaceable deflection member. This opens up the possibility, even in the case of small-scale coin distributors, of also accommodating ~~inside the coin distributor~~ a second device for detecting the passage of a coin inside the coin distributor, without ~~there being the need for~~ too large of an installation space requirements.

[0011] ~~Advantageous developments~~Various embodiments of the present invention are ~~quoted hereinafter~~described below.

SUMMARY OF THE INVENTION

[0012] ~~A particularly advantageous development~~One embodiment provides for a first and a second device for detecting the passage of a coin, the direction of a coin along a coin path in at least one coin shaft being capable of being detected from the signals of the beam receivers. Here the first device is disposed on the displaceable deflection member and the second device is arranged upstream or downstream in respect of the coin path. It is advantageous to accommodate the second device downstream (i.e. generally below the first device), since in this way a manipulation from outside is made more difficult in that the second light barrier is protected by the displaceable deflection member.

[0013] In particular in this variant having two devices for detecting the passage of a coin (as well as the direction), the present invention is useful since it makes it possible to provide two devices directly in the region of the deflection unit. Here the spacing of these devices is also no longer dependent on the size of the deflection unit; it is no longer necessary e.g. to attach one device for detecting the passage of a coin above the deflection unit and one device below the deflection unit (the disadvantage of this is that the spacing between the two devices would then possibly be more than the diameter of one coin, and this would lead to additional manipulation or error possibilities: if two coins run behind one another through the same coin shaft in ~~too~~ quick succession, a reversal of direction of a single coin could be falsely assumed in

this case although in reality two coins were involved).

[0014] ~~A further advantageous development~~An embodiment provides for the device for detecting the passage of a coin to be designed as an arrangement of light barriers. Here the emitter is preferably designed as an infrared light-emitting diode and the beam receiver as an infrared light receiver. The beam ~~switcher~~deflector is to be designed either as a mirror which deflects ~~singly or multiply~~a beam of light one or more times, or as a ~~singly, preferably however multiply~~deflecting prism which deflects a beam of light at least once, but preferably multiple times (e.g. deflecting twice with a total angle of 180°). Additional types of radiation can moreover be ~~utilised~~utilized as the radiation, e.g. visible light, laser light, ultraviolet light.

[0015] ~~A particularly advantageous development~~An embodiment provides for the displaceable deflection member to be a deflection device which can be displaced in translation or a pivotable flap. Mirrors or prisms can easily be arranged in both deflection members.

[0016] Here ~~a particularly advantageous~~an embodiment provides for the beam ~~switcher~~deflector integrated into the deflection device or the flap to be ~~so-designed so~~ that, when the coin shaft is not blocked by a coin or the like and the radiant power of the emitter remains the same, the quantity of radiation received by the beam receiver remains substantially the same~~[[:]]~~.

[0017] This is relatively easy to achieve with a deflection device which is displaceable in translation, by the beam direction representing the same direction as the translational direction of motion of the deflection device.

[0018] In the case of a pivotable flap, an additional curvature optical system can possibly also be provided which ensures that in the different angular positions of the pivotable flap the same radiant power or quantity of radiation of the emitter reaches the radiation receiver.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] The invention is now explained with the aid of a number of drawing figures as described below.~~These show:~~

[0020] Figs. 1a and 1b~~[[:]]~~ illustrate a number of views of a device for detecting the passage of a coin through a coin shaft~~[[,]]~~:

[0021] Figs. 2a and 2b~~[[:]]~~ illustrate a coin distributor according to the invention, respectively with or without a coin~~[[,]]~~; and

[0022] Fig. 3~~[[:]]~~ illustrates the coin distributor according to the invention in a reduced view.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0023] Fig. 1a shows a device for detecting the passage of a coin through a coin shaft. This has an emitter 6a in the form of an infrared light-emitting diode. The light going out from the infrared light-emitting diode 6a passes corresponding openings of two boundary walls 10a or 10b of a coin shaft. On the side of the boundary wall 10b remote from the light-emitting diode 6a is attached a doubly deflecting prism 6b. This prism 6b deflects the light going out from the light-emitting diode 6a by 180° altogether and sends it through two corresponding openings in the boundary walls 10b and 10a to a beam receiver 6c.

[0024] The exact course of the light radiation can be seen indicated by arrows in Fig. 1b. Also in Figs. 1a and 1b ~~can be recognised~~ is a coin 7 which runs through a coin shaft 4 and in so doing interrupts the beam proceeding from the emitter 6a. In this way, the beam receiver 6c briefly does not receive any radiation and this is passed on to a connected evaluation unit as a "credit signal."

[0025] Figs. 2a and 2b show a coin distributor according to the invention. The only difference between these drawings consists in the fact that in Fig. 2a a passing coin 7 is also shown.

[0026] Figs. 2a and 2b show a coin distributor 1 containing a deflection unit 2. This deflection unit is attached to the rear side of a boundary wall 10b. The boundary wall 10b has a slit-shaped opening in which a displaceable deflection member engages, here a deflection device 3 which can be displaced in translation. The deflection unit 2 contains an electromagnet 11, according to which the deflection device 3 lies substantially flush with the boundary wall 10b or protrudes from same. According to the position of the deflection device, a coin 7 is guided into a different coin shaft, i.e. it runs along a different path. In the position shown in Fig. 2a, the coin runs along coin path 9, i.e. coin shaft 4, since the deflection device 3 lies

substantially flush with the boundary wall 10b. In the event of the deflection device 3 protruding a long way from the boundary wall 10b and thus blocking the coin path 9, the coin 7 would be stopped by the deflection device and would run on in the direction of coin shaft 5.

[0027] Here coin shaft 4 is the so-called "acceptance channel", i.e. the shaft for coins to be accepted for which a credit signal is to be emitted. Coins which are not accepted are passed on to coin shaft 5.

[0028] The so-called credit signal is registered on the basis of a device for detecting the passage of a coin through a coin shaft. This device is explained below with the aid of Fig. 2b for reasons of clarity. A device for detecting the passage of a coin comprises the elements already shown in Figs. 1a and 1b, emitter 6a, beam ~~switcher~~deflector 6b and beam receiver 6c, such that here reference is made completely to the above description. The single difference from Fig. 1a consists in the fact that the biprismatic beam ~~switcher~~deflector 6b is not arranged fixed inside a wall but inside the deflection device 3. To guide radiation in or out, the deflection device 3 has two openings which align with the emitter 6a or respectively with the beam receiver 6c.

[0029] It is essential that the beam ~~switcher~~deflector, here the biprism 6b, is secured to the displaceable member, here the deflection device 3. By this means, the above-described advantages of the invention relating to small installation space are exploited. It must also be noted that the beam ~~switcher~~deflector 6b is so designed that, when the coin shaft 4 is not blocked by a coin 7 and the radiant power of the emitter 6a remains the same, the quantity of radiation received by the beam receiver ~~6b-6c~~ remains substantially the same. The reason for this is that the translational movement of the deflection device 3 (due to the electromagnet 11) is in line with the emitter 6a or respectively the beam receiver 6c as well as the radiation emitted or received by same. The radiation is so bundled in the beam control that the alteration in spacing (depending on whether the deflection device 3 is flush with the wall 10b or not) has practically no influence on the quantity of radiation arriving at the beam receiver.

[0030] Alternatively, other displaceable deflection members are obviously

possible, for example pivotable flaps. As the beam switcher~~deflector~~ can here be used (just as in the above deflection unit) also single or multiple mirrors or prisms. In the case of a pivotable flap, a curvature optical system is to be provided if necessary in order to make the light intensity arriving at the beam receiver the same, independently of the position of the flap.

[0031] In order to avoid the "thread tricks" described initially, in each of Figs. 2a and 2b are shown two devices for detecting the passage of a coin. These are first of all a first device 6 (having components 6a, 6b, 6c) and a corresponding second device 8, comprising identical components 8a, 8b, 8c. The structure of the second device 8, especially of the biprism 8b, can be ~~recognised~~ recognized particularly well in Fig. 3.

[0032] Because the second device 8 lies below, (i.e. downstream relative to the coin path 9 in coin shaft 4) this device is protected by the deflection device 3 when the latter is not flush with the wall 10b. Both device 6 and device 8 (especially the beam receivers 6c or 8c) are connected to an evaluation unit which is not shown. If a coin checker is arranged above the deflection device 3 to verify suitable coins, the deflection device 3 travels back into the substantially flush position relative to the boundary wall 10b, such that a coin 7 can run through coin shaft 4 along coin path 9. In this process the evaluation unit initially receives an interrupt signal from beam receiver 6c and then from beam receiver 8c. From this sequence, the direction of the coin can be clearly derived (i.e. its correct passage). According to this, on the basis of the evaluation unit, which is also connected to the electromagnet 11 for driving the deflection device, the deflection device is moved back into the position where it is not flush with the boundary wall 10b, so that it is not possible to withdraw a coin which is selected with the credit signal. For particularly fault-free functioning of the arrangement shown in Figs. 2a to 3, it is advantageous if the spacing between beam receiver 6c and beam receiver 8c in the direction of the coin path 9 is less than the diameter of the smallest valid coin, since in this way malfunctions due to a plurality of small coins falling through in quick succession can be prevented.

ABSTRACT

[0032] The invention relates to a coin distributor, containing a deflection unit comprising a displaceable deflection member for sorting coins into different coin slots ~~or similar~~. The distributor is provided with at least one device for detecting the passage of a coin through a coin slot ~~shaft~~, said device comprising at least one emitter and, a beam switcher, in addition to a beam receiver. The beam switcher is fixed to the displaceable deflection member.